SYMONS'S

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A FLOATING MID-ATLANTIC METEOROLOGICAL OBSERVATORY.

INASMUCH as most of the changes in British weather are due to the passage of cyclonic systems which are traversing this quadrant of the globe from some Westerly towards some Easterly point, it is obvious, and generally recognized, that it is more difficult to forecast the weather which will occur on the West coast of Ireland than in any part of Europe.

It has never seemed to us a very wise arrangement that this forecasting should be done in the extreme *East* of the British Isles, in London, instead of at a Western centre such as Galway; but that is not the point now before us.

The great difficulty in forecasting British weather is the lack of information from the Westward. Excepting the Azores (and they are so far South as to be of little use), there is nothing but ocean West of Ireland until we reach Newfoundland.

Let us not, however, be misunderstood and said to be adverse to the establishment of regular communication with the Azores. By itself we believe that a daily telegram from the Azores would be, as we have said, "of little use" in forecasting British weather; but we think that it would be quite otherwise as regards the more Southern countries of Europe, and if obtained primarily for their benefit, should certainly be reported to our own office.

From the vast stretch of ocean between Ireland and Newfoundland there has hitherto been only one way of obtaining information, viz., that for which the credit will ever remain due to Mr. Gordon Bennett, of the *New York Herald*, and his clever meteorological assistant, Mr. Collins (who perished in the ill-fated Jeanette expedition). His plan was to combine the information of cyclonic movements on the American Continent as obtained from the Signal Office, with the meteorological data for the ocean as stated in the log books of Transatlantic steamers arriving at ports on the Eastern coast of America; he was thus able to track the cyclones after they left the

American coast, and hence infer the trajectory which they would probably follow, and their velocity in it.

Collins, as we have said, perished in the Arctic regions. Had he still been alive, we should certainly have heard some comments from him upon the fact that while Mr. Bennett was at his own cost sending the telegrams to this country, they were stated to be useless; and yet, eight years after they were commenced (the first *New York Herald* warning was sent February 14th, 1877*), we find the English Meteorological Office arranging with the American Signal Office for the transmission of telegrams (at whose cost we do not know) with precisely the object for which Mr. Bennett sent them.

All this, however, is introductory to, and justificatory of, what we are going to plead for—viz., a floating Meteorological Observatory in about Latitude 50° N. and Longitude 20° W. Of course, the first remark that will be made upon the proposal is that it is an impossibility, and the second that the idea is a very old one.

We are aware that the depth of the ocean at the above spot is about 2,000 fathoms, about 2¼ miles, and that a mooring chain of that length would be a novelty—but the days when novelties are regarded as impossibilities have surely passed. Is no encouragement to be derived from the fact that broken telegraph cables have been picked up at even greater depths, and raised to the surface. The precise locality is not, however, to be decided wholly on Meteorological considerations, Meteorologists have little chance of raising the necessary funds, and the Observatory must be also a call station for passing vessels and for those in distress, and these conditions may require a different locality.

We start afresh with some more scraps of history. The first must be very incomplete, since we cannot lay hands on any printed account. About twenty years ago an attempt was made to establish a "call station" for merchantmen entering the Channel, by placing a vessel somewhere South of the Lizard, which vessel had telegraphic connection with the main land. We believe that the vessel was not constructed specially for the work, and the connection was so often broken, that eventually the scheme was abandoned.

The idea of establishing electro-telegraphic communication with ships in shallow water is by no means given up. In the Fisheries Exhibition of 1882 there was at least one full size specimen of a connection adapted for a light-ship, and some such connection has actually been fitted to, and is working from the "Sunk" light-ship nine miles distant, to the coast at Walton-on-the-Naze.

At the Fourth Annual Exhibition of Instruments, held by the Royal Meteorological Society, March 21st, 1883, there was an exhibit thus described in the catalogue:—

"78.—Cartoon of a Vessel designed for automatically compressing and storing air by means of the waves of the sea, and for the generation of elec-

* Comptes rendus—Congrès Internationale de Météorologie.—Paris, 1879, p. 110.

tricity by means of this compressed air. The inventor considers that the vessel can be used as a telegraph ship, and is capable of being moored in 1000 fathoms of water, and connected with the shore at any distance with an electric cable.

"*Exhibited by* C. W HARDING, ASSOC. M.I.C.E."

We believe that we are correct in supplementing this by the statement that Mr. Harding had a small vessel built for experimental trial, and that it was moored off the Norfolk coast.

Lastly, but by no means least, we reprint from our excellent contemporary, the *American Meteorological Journal* for March, the article which has led us to draw special attention to the subject—one which, for the reasons stated at the beginning of our paper, is of infinitely more practical importance to us than to our American friends; for such a station would rarely be able to warn them, and on the contrary would almost always be able to help us :—

METEOROLOGICAL STATIONS IN THE ATLANTIC.

The widespread and increasing interest taken in the information furnished by the U. S. Signal Service, as shown by requests to establish signal stations throughout the country, should be met by establishing meteorological stations in the Atlantic over or near the commercial cable lines, when they would be in communication with both sides of the Atlantic.

The practicability of such stations has been demonstrated by the cable-laying steamship *Faraday*, while laying the cable between France and the United States, and, holding on to the cable, found herself in the course of a cyclone, which passed directly over the vessel without causing her to lose her hold of the cable, and which was at once reported to the European continent, the report giving wind changes and velocity with barometric changes. It is also demonstrated by the light-ship off Frying Pan Shoals, N. C., which is anchored about twenty miles from shore, where it is exposed to the severe storms that occur off the Carolina coast. The value and importance of such stations is apparent; continuous observations could be had, not otherwise accessible; storms could be traced throughout their entire course, and the observations in connection with those of the signal stations on the Atlantic coast would decrease the danger arising from sudden storms.

The steamships of the great ocean lines and others could be warned by signal of storms raging across their path; communication by means of signals could be held with vessels, and vessels reported to owners; proximity of icebergs and wrecks reported, and it might be the means of saving many lives. If but one life were saved, it would compensate for the expense of establishing and maintaining stations These stations, under control of chief signal officers of the army, and manned by observers of the Signal Service, would add valuable data to the science of meteorology. F. S. COBURN.

New River Inlet, N. C., January 25.

To this it may be added that the recording instruments recently brought out by Messrs. Richard Frères will all work on board ship, and thus we could have a floating observatory with continuously recording instruments, a gain of considerable importance.

How many years will the weather forecasters of Europe have to rely upon conjecture, owing to the non-establishment of such an observatory as above suggested?

SIXTH ANNUAL EXHIBITION OF THE ROYAL METEOROLOGICAL SOCIETY.

SUNSHINE AND RADIATION.

YEAR by year with experience accumulating as year succeeds ye the exhibitions of this Society become better organized and mo nearly perfect. We think it a great pity that they are not, l advertisement or otherwise, made more generally known, for if th were we believe that many persons would run up to town and be w rewarded by the excellence of the collections.

The special subjects this year were Sunshine Recorders and Sol and Terrestrial Radiation Thermometers. In accordance with t usual practice, a short ordinary meeting was held before the openi of the exhibition, and the President, Mr. R. H. Scott, F.R.S., read paper, giving a brief account of the various instruments and arran ments to be found in the exhibition for the purposes of recordi solar and terrestrial radiation, and the duration of sunshine both regard to its light and its heat; the last-named being obtained means of the sunshine recorders, which are now pretty genera used. He exhibited twelve monthly maps, showing the percenta proportion of hours of recorded sunshine to the hours the sun w above the horizon in the various districts of the United Kingdo He stated that the features which strike anyone on examining t maps of sunshine, (which are for the most part for the last fi summers and for the last four winters, excluding January to Mar 1885, which has not yet expired), are :—*First*, the broad fact that t extreme South-Western and Southern stations are the sunnie As has already been pointed out, Jersey is undoubtedly the m favoured of our stations in this particular. *Second*, that in the la autumn and winter Ireland is much sunnier than Great Brita Dublin having absolutely the highest percentage of possible durat of sunshine in November and December, and being only equalled Jersey in January. The Dublin instrument is not situated in t city, but at the Mountjoy Barracks, in the Phœnix Park, beyond t Vice-Regal Lodge. The North-East of Scotland is also exceptiona bright, as the station, Aberdeen, lies to leeward of the Grampia In April the line of 40 per cent. of possible duration includes Jers Cornwall, Pembrokeshire, the Isle of Man, and the whole of Irela except Armagh. The absolute maximum of the year occurs in M and the amount rises to 50 per cent. (nearly to 60 in Jersey) over t district just mentioned as enjoying 40 per cent. in April. In Ju there is a falling off, which is continued into July, and even i August in the Western Highlands. In the South of Engla however, a second maximum occurs in August, the figure for Jer rising to 50 per cent. This is mainly due to the exceptionally bri weather of August, 1884, in the Southern Counties of Engla In September Ireland shows a falling off, and the greatest degree

oudiness is in Lincolnshire. In October the Midland Counties of ngland are the worst off. In November the line of 40 per cent. ıcloses two districts ; one Dublin, already mentioned ; the other the astern Counties (Cambridge and Beccles). The absolutely highest onthly percentages in the period under consideration are in the onth of May, 1882, in which St. Anne's Head, Milford Haven, had ? per cent., while Geldeston (Beccles), Douglas (Isle of Man), and outhbourne (Bournemouth), show 61 per cent.

By the kind permission of the Institution of Civil Engineers the xhibition was held in their library, and it remained open from the 'ening of March the 18th until that of the 20th.

Among the features in the organization, which we regard as stinct improvements, we quote (1) the classification of the instruents both on the tables and in the catalogue ; (2) the (with one ıgrant exception) rejection of all duplicates ; and (3) the introducon of brief popular notes on the respective groups of exhibits.

The catalogue fills eight closely-printed pages, and shows no signs the rapidity with which it was written and printed. Remarkably ood as it is, there is still room for improvement, *e.g.*, what can ıyone (who did not visit the exhibition) learn from such entries as—

56. **Davis's Self-timing Anemometer,** for self-recording the current of air in mines, furnaces, &c. The indications are per second or per minute, and the use of a watch is dispensed with.
Exhibited by Messrs. JOHN DAVIS AND SON.

57. **Meteorologist's Wind Vane or Anemoscope.**
Exhibited by G. M. WHIPPLE, B.Sc., F.R.Met.Soc.

Considerations of space, of cost, and of time necessarily prevent e catalogue being thoroughly descriptive, but we are glad to hear at an illustrated edition of it will probably appear, and we hope at the opportunity will be seized to add to more of the titles ferences to publications in which the objects are fully described.

The following paragraphs will give a general notion of the instruents exhibited, but there were many, especially in the miscellaneous ass, to which no reference is made. We may notice especially (38) instanley's Radiograph, a crude but very suggestive instrument, ıd the cloud photographs, which formed exhibits (74) and (75), the ıner being from the vicinity of the Lick Observatory in California, 50ft. above sea level, and the others taken by Mr. G. W. Ormerod, R.Met.Soc. at Teignmouth.

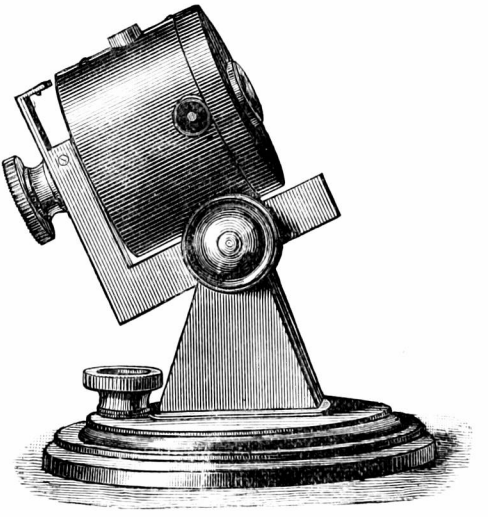
SUNSHINE RECORDERS.

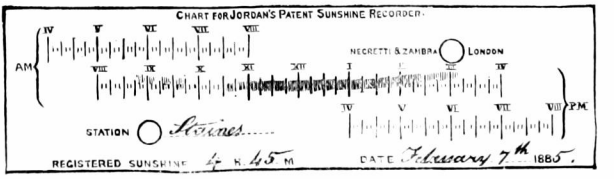
The first attempt at obtaining an instrumental record of the amount sunshine was made by Mr. J. F. Campbell, of Islay, in the year 54, when he mounted a hollow glass sphere filled with acidued water in the centre of a cup of mahogany so arranged at the sun's rays were focussed on the interior of the cup and rned it. The lines of burning therefore indicated the existence of ısshine.

Solid glass spheres were substituted for the hollow ones in 1857, and cards in metal frames (1875) have replaced the wood; but in its principle the sunshine recorder of 1885 differs little from that erected on Richmond-terrace, Whitehall, thirty years ago.

Other modes of recording sunshine are based on the action of the rays of the other end of the spectrum, of the actinic, instead of the heat, rays. Among workers in this direction may be mentioned Marchand of Fécamp, Sir Henry Roscoe, and others. The most recent improvements in this direction are those by McLeod and by Jordan. In both the registration is produced by the action of a ray of sunlight on sensitized photographic (ferro-prussiate) paper. We believe that Prof. McLeod's has not advanced beyond the experimental stage—at any rate it is not yet ready for sale—and we are not sure that it ever will be, for it is much more cumbersome and complicated than Jordan's, and does not give so handy a record. However that may be, Jordan's has the advantage of being first in the field, and when to this we add that it is made by Negretti and Zambra, and sold for about one-third of the price of the "burning-recorders," (we are obliged to coin new words to distinguish the old pattern from the new "actinic-recorders") it will be understood that thoroughly well-made instruments of the new pattern are not at all costly.

The apparatus and its manipulation are extremely simple; there is a small brass box, with apertures facing E., S. and W., forming a dark chamber, which is pointed towards the South, and with its axis





adjustable according to the latitude in which it is used, and to the altitude of the Sun; this adjustment offers no difficulty, as no harm is done by opening the lid for a few seconds and looking to see that the sun's image is falling on the proper part of the printed photographic paper. The daily observation does not take five minutes, and can be made at any time between sunset and sunrise. One has merely to unclamp a screw, take the box indoors, take out the record sheet, put in a new one, and replace the box. At this very early stage the photographic papers are not quite perfect, the fainter portions of the records disappearing when, to make the record permanent, the paper is dipped in water; but this (temporary, we believe,) difficulty is easily surmounted by marking with pen or pencil the extreme limits of colouration after taking the record sheet out of the box, and before dipping it in the water.

Just as the "burning-recorders" have their faults so has this actinic one, but it gives very pretty records (as we ourselves have proved) with very slight trouble, and may fairly be described as a fascinating little apparatus.

SOLAR RADIATION THERMOMETERS.

The successive stages in the assumed perfecting of this instrument have been as follows:—An ordinary mercurial thermometer acts as a spherical mirror, and reflects the rays which fall upon it. To lessen this the bulbs were first made with black glass; moreover, originally the degree marks were put upon the supporting slab, then they were put upon the tubes of the thermometers.

It was then found that in a position where two thermometers with similarly coated bulbs were exposed to the sun, but one was exposed to more wind than the other, the indicated temperatures varied greatly. To avoid this it was proposed that the thermometer should be inserted in a glass shield exhausted of air. Various forms of mounting have been adopted, but the chief efforts have been expended in determining the influence of the amount of air left in the so-called vacuum. The next stage was, that inasmuch as black glass has a bright surface there was still much heat reflected, and therefore the surface was dulled with a coat of lamp black—so that all heat falling upon the bulb might be absorbed. Subsequently, owing to the influence of the lower temperature of the unblackened thermometer tube, about 1 in. of it was coated like the bulb.

As evidence of the degree of exhaustion, a small mercurial pressure gauge was attached to the thermometer by one firm, and by other makers platinum wires were soldered through the shield so that the stratification of the electric arc might indicate the amount of air still left in the so-called vacuum.

TERRESTRIAL RADIATION THERMOMETERS.

The pattern of minimum thermometer used for measuring terrestrial radiation has varied very little. The Rutherford minimum has

almost always been used, but its sensitiveness has gradually been increased; the spherical bulb was replaced by a cylinder, the cylinder was elongated and bifurcated, and eventually, in order to strengthen the forks, they were united into what is known as a "link."

Another plan was to flatten the cylindrical bulb into as thin a plate as possible, this giving a maximum of surface in proportion to the contents.

The bulb was also made as a double cylinder, and thus we have the so-called "bottle" pattern, and then the tube was led into the side of the bottle, and both of its ends were left open, and so we have the "open cylinder"—a remarkable specimen of glass blowing.

Then there have been two patterns of mercurial thermometers, Casella's and Negretti's.

Difficulties have arisen from the degree marks being obliterated by the weather. To guard against this, the tube has been enclosed in what is known as Leach's shield, and many attempts have been made to render the joint at the entrance of the tube water tight. This is not easy, because the thermometer is exposed to a great range of temperature, and the air inside the shield varies so much in volume that it forces its way through almost every joint. The object has, however, lately been effected by sealing the external jacket on the stem near the bulb, a feat in glass blowing formerly declared to be impossible with enamelled tubes, owing to the difference of expansion of the transparent and of the opal glass.

THE CLIMATE OF BAYONNE.*

THE Observatory of Saint Martin-de-Hinx is situated about a dozen miles inland, and slightly to the North of Bayonne, at an elevation of about 130 ft. above the sea. It is, therefore, in the extreme S.E. corner of the Bay of Biscay, and with the Cantabrian and Pyreneean ranges of mountains forming a long ridge to the south of it. The director of the Observatory, M. Carlier, is a thoroughly careful man; the station is one of M. Mascart's Second Order Stations, the results being regularly published by him in the *Annales*; and observations are made every three hours with the exception of midnight and three a.m.; besides which the Observatory is furnished with some continuously recording instruments.

For these reasons a summary of the results for twenty years from this Observatory commands attention as a valuable contribution to our knowledge of the meteorology of the S.W. of France.

We may explain, before discussing the data, that the whole pamphlet of 32 quarto pages is lithographed and copiously illustrated by diagrams. From it we have extracted some of the salient features, have converted them into English measures, and in the case of the

* *Comparaison de Vingt Années. Observations Météorologiques faites à Saint-Martin-de-Hinx, France (Landes).* Par H. CARLIER, 1er Décembre, 1864, au 30 Novembre, 1884. Bayonne, 1885. 4to.

barometer have also applied a rough correction for its altitude (131 ft.); the outcome of these operations being the two following tables, one giving monthly means and the other annual values for each of the twenty years.

Monthly values for St. Martin-de-Hinx.

	Mean Sea Level Pressure.	Mean Temp.	Mean No. of Frosts.	Mean Humidity.	Mean Amount of Cloud.	Rain.	
						Amount.	Days.
	in.	°				in.	
January ...	30·14	43·9	9	82	6·4	4·47	16
February..	30·13	46·9	5	78	6·3	3·81	15
March.....	30·02	48·9	3	76	6·4	4·21	19
April	29·98	54·2	0	76	6·6	4·81	17
May	30·02	59·5	0	75	6·0	3·74	16
June	30·09	64·2	0	77	6·1	4·72	15
July	30·09	68·2	0	77	5·4	3·16	13
August ...	30·07	68·2	0	78	5·2	2·79	12
September	30·06	64·6	0	80	5·8	5·82	14
October ..	30·04	57·1	0	82	6·4	6·34	18
November.	30·07	49·0	4	82	6·6	5·56	18
December.	30·09	42·9	11	82	6·9	5·20	17
Year ...	30·07	55·6	32	79	6·2	54·63	190

Annual values for St. Martin-de-Hinx.

	Mean temp.	Total No. of Frosts.	Prevailing wind.	Rain.	
				Amount.	Days.
	°			in.	
1864–5	57·5	20	W.N.W.	57·92	194
1865–6	56·3	32	W.N.W.	53·04	230
6–7	57·5	22	W.	48·74	219
7–8	56·6	36	N.N.W.	48·43	182
8–9	57·6	15	W.S.W.	51·69	177
1869–70	56·1	41	W.	40·68	159
1870–71	55·8	46	N.E.	52·40	191
1–2	55·9	31	W.S.W.	55·91	191
2–3	57·1	16	W.S.W.	57·87	205
3–4	56·3	51	N.N.E.	45·04	167
4–5	55·5	34	S.W.	61·02	192
5–6	53·6	53	S.S.W.	40·55	166
6–7	56·4	14	W.N.W.	58·20	204
7–8	55·2	36	S.W.	61·58	204
8–9	54·1	16	W.N.W.	75·02	213
1879–80	53·4	59	W.N.W.	53·12	165
1880–81	55·6	18	N.N.W.	48·43	199
1–2	54·1	42	N.W.	74·68	187
2–3	54·4	29	N.W.	66·05	198
3–4	54·7	31	N.N.E.	42·52	151
Mean	55·6	32	W.N.W.	54·63	190
Max.	57·6	59	—	75·02	230
Min.	53·4	15	—	40·55	151

We add a few remarks which would not go into the tables.

As regards the barometric range, it is, of course, far smaller than in England.

	St. Martin-de-Hinx.		London.		Difference.
		in.	in.		in.
Absolute Max.....	1878, Jan. 13th,	30·85 ...	30·85,	18th Feb., 1873 ...	0·00
,, Min.....	1874, April 11th,	29·01 ...	28·33,	24th Jan., 1872 ...	—·68
Extreme range.....		1·84 ...	2·52,	...	+·68

The range of temperature is large, owing to the severe frost of January, 1881, on the 16th day of which month the temperature fell to 8°·8, which was several degrees below any other instance in the twenty years. There are, however, several years in which the mean for the month of December or of January has been below 37°. The absolute maximum was 103°·5 on July 23rd, 1870. The thermometers are 6 ft. above the ground.

The rain gauge is about 5 ft. above the ground; the average fall is rather large (54·63 in.), about the same as Tavistock, Keswick or Kendal. The wettest year had an excess of 37 per cent. above the mean, and the driest year a deficiency of 26 per cent. below it, a range of 63 per cent.

The air is sometimes very dry. We notice that on July 23rd, 1870, the humidity is given as only 12, and there are several months in which it has fallen to 15 and 16.

THE CLIMATE OF MARLBOROUGH (WILTS.)

By one of those coincidences which have always a certain amount of drollery about them, we were writing the abstract of M. Carlier's twenty years' work near Bayonne when Mr. Preston's summary of twenty years' work at Marlborough* arrived. It will add to the interest of each, to treat the latter as nearly as possible in the same manner as the former, and in the same number of this Magazine.

We are compelled to make some differences, but they are not serious; we cannot give the barometer, because a change was apparently adopted about 1873–75, and while previously the values were given uncorrected for altitude, after about that period they appear to be corrected. And we cannot give the wind, inasmuch as this volume does not mention it—but a great store of useful values remains.

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* *Results of Twenty Years' Observations on Botany, Entomology, Ornithology and Meteorology taken at Marlborough College*, 1865–84. Oblong 4to 52 pages. [No name of author, printer or publisher, no place and no date].

Monthly Values for Marlborough.

	Mean Temp.	Mean No. of Frosts.	Mean Amount of Cloud.	Rain.	
				Amount.	Days.
	°			in.	
January ...	37·5	11	7·5	3·55	17
February ..	39·6	9	7·9	2·77	17
March ...	40·1	13	7·0	2·06	14
April	41·5	5	6·9	2·26	14
May... ...	50·3	3	6·5	2·15	12
June..	56·4	0	6·8	2·44	13
July..... ...	60·0	0	6·6	2·84	14
August ...	59·2	0	6·2	3·11	14
September.	55·4	0	6·5	3·54	15
October	48·0	4	7·0	3·56	17
November.	41·3	10	7·0	3·24	16
December.	38·4	12	7·4	3·02	17
Year ...	47·3	67	6·9	34·54	180

To the tabular values we may add that the highest temperature in shade was 92°·0 on August 13th, 1876, and the lowest 1° on January 5th, 1867. The maximum yearly rainfall 43·79 in. in 1882, and the least 23·41 in. in 1870, being respectively 27 per cent. above, and 33 per cent. below the mean, or a range of 60 per cent.

The humidity is not reported for each month, but for the year it is given as 85, or 6 per cent. *more* than at Bayonne, although the rainfall is one third *less*.

We have not touched upon the mass of data (unequalled to our knowledge) respecting natural history given in these tables, as we leave that subject for other journals to whose province it belongs.

THE RED SUNSETS.

A NEW way of obtaining an explanation of the above phenomena has been adopted by Mr. Warner, of the Warner Observatory, Rochester, New York, and is mentioned on pages 454, 455 of the *American Meteorological Journal*. Mr. Warner writes :—

"I will give a prize of two hundred dollars (about £42) to any person in the world who will write the best 3,000-word paper on the cause of the atmospheric effects (red light, &c.) accompanying sunset and sunrise during the past sixteen months. It is desired that these papers be as original as possible, both in facts, observation, and treatment.

"Essays must be exclusively sent prepaid to Dr. Lewis Swift, Director, Warner Observatory, Rochester, New York, must be written in English, on one side of the paper only, and must be in the simplest, untechnical phrase. Each competitor must sign a *nom de plume* to his essay, and enclose his real name and address in an envelope, superscribed with his *nom de plume*. The essays must be in Dr. Swift's hands by December 1, 1885.

"Three disinterested scientists will be selected to determine the result.

"H. H. WARNER.

"*Rochester, New York, January 17th, 1885.*"

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, SEPT., 1884.

STATIONS. (Those in italics are south of the Equator.)	Absolute. Maximum. Temp.	Maximum. Date.	Minimum. Temp.	Minimum. Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	TotalRain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0–100	°	°	inches		
England, London	81·5	18	40·6	30	68·8	52·3	53·8	82	116·6	33·6	1·77	15	5·8
Malta	90·1	26	62·2	22	81·2	67·5	64·3	73	140·3	57·6	0·54	2	2·0
Mauritius	80·5	22	57 5	29	77·0	63·8	59·4	71	130·6	49·6	1·19	15	5·1
Calcutta	89·4	17*	74·1	6	85·7	76·7	76·8	87	154·8	69·8	16·63	20	7·4
Bombay	85·8	9	73·1	27	83·3	75·7	75·8	89	143·6	71·1	17·04	26	8·0
Ceylon, Colombo	85·5	11	74·8	22	84·1	74·3	73·0	82	143·2	65·0	5·45	17	6·8
Melbourne	79·0	9	35·0	17	64·4	45·4	41·0	63	131·6	28·7	0·68	8	5·7
Adelaide	82·0	18	40·9	14	65·8	49·1	44·4	62	138·1	31·3	2·63	16	5·3
Wellington	65·0	26	34·4	15	56·6	45·3	...	...	128·0	29·0	5·86	17	..
Auckland	65·0	3	40·0	19	59·9	49·1	45·6	72	133·0	33·0	3·27	20	7·0
Jamaica, Kingston	92·7	18	71·9	10	88·7	74·0	73·2	79	...	...	3·33	...	6·5
Barbados	85·0	6†	71·0	var.	83·0	73·0	75·9	85	147·0	...	3·38	16	5·0
Toronto	85·2	10	34·9	19	71·5	51·6	55·5	77	137·0	29·5	3·19	16	5·2
New Brunswick, Fredericton	84·7	4	30·5	14‡	66·9	44·0	48·9	77	...	...	3·91	14	5·1
Manitoba, Winnipeg	70·6	1	36·7	25	59·4	43·2	46·3	82	...	...	3·75	15	5·6
British Columbia, Victoria	65·0	6	35·0	26	...	...	...	...	...	...	1·66	14	...

* And 20. † And 7, 21. ‡ And 15.

REMARKS, SEPTEMBER, 1884.

MALTA.—Mean temp. 73°·5; mean hourly velocity of wind 8·1 miles; sea temp. l from 78° to 76° by the 10th, and remained stationary to the end. TS on the 13th, on 11th and 12th. J. SCOLES.

Mauritius.—Rainfall 0·37 in., mean temp., 0°·1 and mean hourly velocity of wind miles, below their respective averages. Prevailing winds S.E. by E., to E. by S. loured skies before sunrise and after sunset throughout, but of shorter duration and s intensity than formerly. C. MELDRUM, F.R.S.

Melbourne.—Mean temp. 1° above the average; rainfall 1·65 in., temp of dewpoint 6, humidity 8, and amount of cloud ·4 below their respective averages; pressure erage. Prevailing winds N. and W., strong on 7 days; H on two days, hoar frost three, L on three. R. L. J. ELLERY, F.R.S.

Adelaide.—Mean pressure and temp. slightly, and rainfall and amount of cloud, nsiderably, above average. R fell as far N. as lat 28°, and well over the N.E. and W., pastoral areas and the N. agricultural districts during the latter part of the nth reviving the crops, which were looking sickly. C. TODD.

Wellington.—Fine from 4th to 11th; remainder of the month showery and settled. Rainfall 1·23 in. above average, temp. 0°·3 below it. R. B. GORE.

Auckland.—Showery and disagreeable weather throughout, but total rainfall not excess. Heavy gales on 3rd, 14th and 30th. T. F. CHEESEMAN.

Kingston.—Rainfall still below average, and distributed very irregularly over the land. In the Blue Mountain district, springs and watercourses are lower than as ever known before, and vegetation is much burnt up. Earthquake at 9.58 p.m. Sept. 6th, at Montego Bay, Mount Charles, and Windsor simultaneously. Prevailing wind S.E.; mean hourly velocity 3 miles. MAXWELL HALL.

BARBADOS.—Mean temp. (77°·1) about the average. Pressure steady; rainfall below e average. N.E. winds on 27 days, average velocity 7·1 miles per hour, extremes 3 miles and 4·2 miles. Six days overcast. TS on the 11th. R. BOWIE WALCOTT.

SUPPLEMENTARY TABLE OF RAINFALL, MARCH, 1885.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
II.	Dorking, Abinger	2·34	XI.	Rhayader, Nantgwillt..	3·06
,,	Margate, Birchington...	·92	,,	Carno, Tybrith	1·58
,,	Littlehampton	2·08	,,	Corwen, Rhug	1·02
,,	Hailsham	2·32	,,	Port Madoc	4·44
,,	I. of W., St. Lawrence.	1·52	,,	I. of Man, Douglas	3·77
,,	Alton, Ashdell.....	1·94	XII.	Stoneykirk, Ardwell Ho.	3·64
III.	Winslow, Addington ...	1·19	,,	Melrose, Abbey Gate ...	1·35
,,	Oxford, Magdalen Col...	1·10	XIII.	N. Esk Res. [Penicuick]	2·00
,,	Northampton	·99	XIV.	Ayr, Cassillis House ...	...
,,	Cambridge, Beech Ho...	·80	,,	Glasgow, Queen's Park.	1·14
,,	Wisbech, Bank House..	·84	XV.	Islay, Gruinart School..	2·14
IV.	Southend	1.14	XVI.	St. Andrews, Newton Bk	2·37
,,	Harlow, Sheering	1·11	,,	Balquhidder, Stronvar..	5·66
,,	Rendlesham Hall	1·01	,,	Dunkeld, Inver Braan..	1·88
,,	Diss	1·14	,,	Dalnaspidal H.R.S. ...	3·86
,,	Swaffham	1·28	XVII.	Keith H.R.S.	2·45
V.	Salisbury, Alderbury...	1·47	,,	Forres H.R.S.	1·63
,,	Warminster	1·16	XVIII.	Strome Ferry H.R.S....	5·10
,,	Calne, Compton Bassett	1·29	,,	Lochbroom	4·49
,,	Ashburton, Holne Vic..	2·82	,,	Tain, Springfield.....	1·43
,,	Holsworthy, Clawton...	1·72	,,	Loch Shiel, Glenaladale	9·31
,,	Hatherleigh, Winsford.	2·53	,,	Invergarry	5·26
,,	Lynmouth, Glenthorne.	1·29	XIX.	Lairg H.R.S.	1·65
,,	Probus, Lamellyn	1·96	,,	Forsinard H.R.S.	2·14
,,	Wincanton, Stowell Rec.	1·42	,,	Watten H.R.S.	1·71
,,	Wells, Westbury.....	1·14	XX.	Dunmanway, Coolkelure	4·56
VI.	Bristol, Clifton	1·22	,,	Fermoy, Gas Works ...	2·85
,,	Ross	1·44	,,	Tralee, Castlemorris ...	2·62
,,	Wem, Sansaw Hall.....	·99	,,	Tipperary, Henry Street	3·11
,,	Cheadle, The Heath Ho.	1·60	,,	Newcastle West	1·12
,,	Worcester, Diglis Lock	1·13	,,	Miltown Malbay.....	3·46
,,	Coventry, Coundon	1·11	,,	Corofin	...
VII.	Melton, Coston	·79	XXI.	Carlow, Browne's Hill..	2·04
,,	Ketton Hall [Stamford]	1·22	,,	Navan, Balrath	1·29
,,	Horncastle, Bucknall ...	·96	,,	Mullingar, Belvedere ...	2·54
,,	Mansfield, St. John's St.	1·42	,,	Athlone, Twyford	3·22
VIII.	Macclesfield, The Park.	2·26	XXII.	Galway, Queen's Col....	1·66
,,	Walton-on-the-Hill.....	2·13	,,	Clifden, Kylemore	10·22
,,	Lancaster, South Road.	3·57	,,	Crossmolina, Enniscoe..	4·40
,,	Broughton-in-Furness ..	...	,,	Carrick-on-Shannon ...	1·83
IX.	Wakefield, Stanley Vic.	1·16	XXIII.	Dowra	...
,,	Ripon, Mickley	2·20	,,	Rockcorry.....	...
,,	Scarborough.....	1·52	,,	Warrenpoint	3·18
,,	East Layton [Darlington]	2·07	,,	Newtownards	2·11
,,	Middleton, Mickleton..	1·77	,,	Belfast, New Barnsley .	3·27
X.	Haltwhistle, Unthank..	2·34	,,	Cushendun	3·84
,,	Shap, Copy Hill	4·88	,,	Bushmills	1·82
XI.	Llanfrechfa Grange	1·89	,,	Stewartstown	1·74
,,	Llandovery	1·75	,,	Buncrana	2·52
,,	Castle Malgwyn	2·31			

MARCH, 1885.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1870–9	Greatest Fall in 24 hours. Dpth	Date.	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Date	Min. Deg.	Date	No. of Nights below 32°. In shade.	On grass.
			inches	inches.	in.								
I.	ENGLAND.	London (Camden Square) ...	1·65	+ ·04	·74	21	7	62·6	20	26·5	8	12	24
II.		Maidstone (Hunton Court)...	1·39	— ·19	·59	22	6	...	...	...	...	...	...
,,		Strathfield Turgiss	1·97	+ ·57	·76	22	11	62·2	20	21·9	9	15	24
III.		Hitchin	1·12	— ·36	·48	3	6	58·0	29	25·0	1*a*	22	...
,,		Banbury	·92	— ·68	·36	3	9	57·0	20	24·0	8	15	...
IV.		Bury St. Edmunds (Culford)	1·10	— ·46	·49	3	11	58·0	20	23·0	30	22	...
,,		Norwich (Cossey)	1·29	— ·40	·51	3	13	56·5	20	24·0	22	17	24
V.		Weymouth(LangtonHerring)	1·49	...	·61	3	11	...	...	...	...	...	...
,,		Barnstaple	1·92	— ·57	·42	21	13	54·0	5	28·0	8	...	...
,,		Bodmin	2·57	— 59	·54	2	14	52·0	3*b*	30·0	var.	6	18
VI.		Stroud (Upfield)	1·26	— ·55	·44	21	12	58·0	4*c*	26·0	7	10	...
,,		ChurchStretton(Woolstaston)	1·36	— ·80	·28	29	16	54·0	17	26·5	10*d*	15	21
,,		Tenbury (Orleton)	1·28	— ·59	33	21	14	57·0	20	24·3	8	16	18
VII.		Leicester	1·14	...	·18	3	16	56·2	17	26·2	15	12	27
,,		Boston	·83	— ·46	·38	3	7	55·0	15	29·0	22	11	...
,,		Grimsby (Killingholme).....	1·83	+ ·17	·44	5	14	53·5	20	30·0	7*e*	5	...
,,		Hesley Hall [Tickhill].....	1·07	...	·31	3	14	55·0	28	25·0	2	16	...
VIII.		Manchester (Ardwick).....	2 25	— ·20	·43	3	15	51·0	4*g*	29·0	7*i*	14	...
IX.		Wetherby (Ribston Hall) ...	1·59	— ·54	·42	4	6	...	...	...	...	...	...
,,		Skipton (Arncliffe)	4·91	+ ·15	1·01	31	15	53·0	14	25·0	14	17	...
X.		North Shields	2·22	+ ·77	·43	4	14	56·8	20	26·0	31	17	18
,,		Borrowdale (Seathwaite).....	14·86	+ 4·97	2·90	31	19	52·9	13	25·5	22	5	...
XI.	WALES.	Cardiff (Ely)..	2·17	— ·52	·60	29	11	...	...	...	...	...	...
,,		Haverfordwest	3·39	+ ·20	1·00	31	12	53·0	3*f*	24·5	7	14	19
,,		Plinlimmon (Cwmsymlog) ...	3·20	...	·70	31	12	...	...	...	...	..	...
,,		Llandudno.....	1·88	·00	·28	20	12	55·6	26	31·0	7	3	...
XII.		Cargen [Dumfries]	2·26	— ·52	·56	31	11	52·0	14*f*	25·0	1*g*	16	...
,,		Jedburgh (Sunnyside)..... ...	1·34	— ·23	·52	29	8	53·0	14*h*	23·0	23	17	...
XIV.		Douglas Castle (Newmains)	2·73	— ·41	·89	31	10	...	...	...	..	...	...
XV.		Lochgilphead (Kilmory)	4·00	— ·61	·82	28	16	...	...	...	...	...	...
,,		Oban (Craigvarren)	3·64	...	1·18	31	12	54·0	13	27·0	9	5	...
,,		Mull (Quinish).....	3·73	...	·89	31	16	...	...	...	...	...	...
XVI.	SCOTLAND.	Loch Leven Sluices	2·90	+ ·78	·80	4	9	...	...	...	...	...	...
,,		Arbroath	2·02	+ ·39	·73	29	7	52·0	20	27·0	23	10	...
XVII.		Braemar	1·74	— 45	·33	28	18	49·8	13	21·0	23	25	31
,,		Aberdeen	1·57	...	·45	29	21	53·0	13*j*	27·0	20	12	...
XVIII		Skye (Sligachan)	...	...	...	...	...	..	...	...	...	...	...
,,		Culloden	1·31	— ·44	...	...	...	55·0	26	26·3	23	10	24
XIX.		Dunrobin	2·27	...	·72	17	15	53·0	23	23·0	9	12	...
,,		Orkney (Sandwick)	2·63	— ·01	·40	31	23	48·6	21	26·4	21	6	15
XX.		Cork (Blackrock)	3·50	+ ·74	1·08	2	12	60·0	26	27·0	30	13	...
,,		Dromore Castle	3·40	...	·70	31	12	57·0	27	29·0	15	...	...
,,		Waterford (Brook Lodge) ...	3·15	...	·84	28	13	56·5	20	23·0	7	14	26
,,		Killaloe	2·29	...	·80	31	13	53·0	23	27·0	10*h*	15	...
XXI.	IRELAND.	Portarlington	1·79	— ·37	·55	28	20	44·0	3	26·5	11	13	...
,,		Dublin (FitzWilliam Square)	1·53	— ·20	·31	3	13	58·6	26	29·0	12*h*	10	20
XXII.		Ballinasloe	2·07	·31	·52	28*g*	17	52·0	26	22·0	10	18	...
XXIII		Waringstown	2·00	— ·06	·60	28	13	57·0	26	22·0	9*h*	17	23
,,		Londonderry (Creggan Res.).	2·60	...	·57	28	21	...	...	...	...	...	...
,,		Omagh (Edenfel)	2·18	+ ·09	·60	31	17	50·0	26	26·0	11	14	...

And 6, 9, 11. *b* And 20, 31. *c* And 5. *d* And 19. *e* And 22, 28. *f* And 20. *g* And 31. *h* And 15. *i* And 10, 12, 19. *j* And 14, 17, 20.

+ Shows that the fall was above the average; — that it was below it.

METEOROLOGICAL NOTES ON MARCH.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min for Minimum; T for Thunder; L for Lightning; T S for Thunderstorm; R for Rain; H for Hail S for Snow.

ENGLAND.

STRATHFIELD TURGISS.—A splendid month for agricultural purposes, tillage and seeding most favorably completed. The frosts at night imposed a healthy check on vegetation, and prevented too early opening of fruit bloom. Nettle tortoiseshell butterfly seen flying on 27th; frog spawn seen on 16th, marsh marigold in flower on the 9th, broom on 20th, plum on 25th.

BANBURY.—A favourable month for agricultural operations; hawthorn buds which were showing at the end of February had not fully expanded at the close of March. Mean temp. 39°·6. Mean amount of cloud at 9 a.m. 5·6. S on 3 days, high wind on 2, fog on 1, distant T on 24th.

CULFORD. A fine dry month, with cold winds and frequent sharp frosts which checked vegetation. Fruit prospect good.

LANGTON HERRING.—A dry cold month, favourable for farming operations. With the exception of March 1883 this was the coldest March for 14 years. Mean pressure above average. Solar halo on the 5th.

BODMIN.—A fine seasonable month. Mean temp. 41°·4, the lowest recorded for 36 years.

STROUD.—A fine dry month, with cold winds; S on 4th and 21st; H and sleet on 18th.

WOLSTASTON.—A cold month with sharp frosts at night during the greater part. S on 5th and 21st. Mean temp. 39°·5.

ORLETON.—Although frosty nights and fine days prevailed during the greater part of the month, the mean temp. was only 0°·5 below the average of 24 years. Pressure high and generally steady, although there were frequent gales of wind. A fall of S occurred on the night of the 21st, covering the ground to the depth of nearly 3 inches, but it soon disappeared on the 22nd. The land was in a very favourable state for the planting of spring crops. Prevailing winds N. and E.

KILLINGHOLME.—A cold month with no gales, dry after the first week. The ground was well pulverised for sowing, but R was wanted for the seed to germinate and for the pastures Vegetation backward.

MANCHESTER.—On the whole a fine seasonable month, with many cold and frosty nights keeping back vegetation, and making spring more hopeful, for in this district a late spring is always the best.

WALES.

HAVERFORDWEST.—The first four days of the month were gloomy, cold and wet, after which the weather became fine and clear, with sharp night frosts and keen N.E. winds up to the 16th; the weather then became changeable, but was still very cold with frosty nights, and the month ended stormy, boisterous, and cold. Prevailing winds E.N.E. and S.E. Mean temp somewhat below the average; pressure high about the middle of the month. Scarcely any primroses, and grass lands very bare.

LLANDUDNO. - On the whole a fine month for March, with mean temp. rather more than 1° below the average. There were many fine bright days, and, with the exception of the 17th, 18th and 29th, there was no very stormy weather. Range of temp. about the average.

SCOTLAND.

CARGEN.—Strong winds prevailed at the commencement and towards the end of the month. Mean temp (39°·0), 2°·2 below the average; pressure 0·222 in. above the average.

JEDBURGH.—The weather was dry, with remarkably cold winds, causing the finest seed-time for many years. Vegetation much retarded, and spring flowers much affected by frost. S on the 4th, 18th and 29th.

OBAN.—The month was unusually dry, with low temp. The latter part of the month was somewhat disturbed by moderate gales on the 16th, 20th, 26th,

28th and 31st; the last being the worst, and producing a very heavy rainfall S on 21st, H on 31st.

QUINISH.—From the 1st to the 15th very fine, with occasional slight frost; thereafter cold, stormy, and unsettled.

ABERDEEN.—Altogether the weather was dry and open during the month. Rainfall about half-an-inch below the average. Aurora was observed on the nights of the 15th and 16th, after which the weather became squally, and the remainder of the month was unsettled. Lunar corona on the 23rd, H on two days, S on three, sleet on four, hoar-frost once.

CULLODEN.—The weather was dry, cold and ungenial throughout the month. From the commencement to the 24th very little R fell, and frost generally prevailed; no sign of vegetation at the close of the month.

IRELAND.

DROMORE.—The month on the whole was very fine, in fact one of the best Marches for some years.

WATERFORD.—Rainfall slightly above the average; S on 17th; H on 8th; fog on 26th.

KILLALOE.—A very favourable month for spring operations. Mean temp. (40°·9) below the average with many night frosts. The weather at the close of the month was very wintry and severe.

DUBLIN.—A cold, generally dry month. Searching "polar" winds prevailed to a large extent. The mean temp. (40°·7) was 2°·0 below the average. Rainfall and number of rainy days below the average. Mean humidity 82; mean amount of cloud 5·6; prevailing winds W., N.N.E., and N.W. S on 18th; sleet on 10th and 29th; H on 6th, 8th, and 18th; solar halo on 31st; aurora on the 15th; fog on several days.

EDENFEL.—The temp. of the month was low, with frost more or less keen on 14 nights. The greater part of the R fell on the first day, and in the last week, and during the intervening period 13 days were bright, cloudless and cold. Vegetation very backward. S on the 18th.

THE NEW TIME.

To the Editor of the Meteorological Magazine.

SIR,—Is it not premature to come to the conclusion that the New Time is dead and buried? There is a good article on the subject in *The Observatory* for March, written by the Editors, which contains a different opinion, and considers that, so far as astronomy is concerned, the change of reckoning time may suitably be made at a not very distant date. I entirely agree with this article, excepting the writers' suggestion (if I understand it aright) that the general public should make the change at an earlier date than astronomers, in order that the latter might know they were not inconveniencing themselves uselessly. I do not wish unduly to discourage others from making the change before astronomers make it, though I consider it would be more convenient for all to make the change simultaneously. This especially refers to meteorologists and astronomers, as the two sciences so closely touch each other.

So great an authority as Professor Newcomb holds that the change, if made at all, should take place at the commencement of the next century. If that occur, the present reckoning of time would not "survive for generations," as you fear it will. It appears, however, that the final Report of the Prime Meridian Conference has not yet been received, and that therefore the attempt to make the change now is altogether too hasty.

Sunderland, April 4, 1885. T. W. BACKHOUSE.